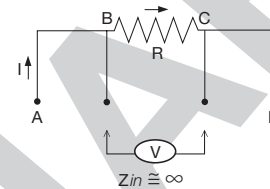
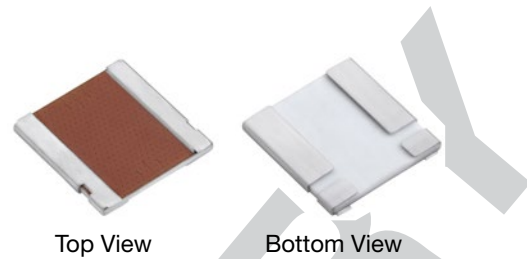


## Model 303337 Bulk Metal® Foil Technology CSM3637F, with Screen/Test Flow in Compliance with EEE-INST-002 (Tables 2A and 3A, Film/Foil, Level 1) MIL-PRF-55342 and MIL-PRF-49465

### FEATURES

- Temperature coefficient of resistance (TCR):  
10 ppm/°C max. (-55°C to +125°C, +25°C ref.)  
For tighter TCR please contact us.
- Power rating: 3 W
- Resistance tolerance: to ±0.1%
- Resistance range: 50 mΩ to 200 mΩ
- Load-life stability: to ±0.02% typical  
(70°C, 2000 h at rated power)
- Electrostatic discharge (ESD): at least to 25 kV
- Solderable terminations
- For prototype units, append a “U” to the model number  
(example: 303337U). These units have all of the table  
2A (page 3) 100% tests performed, with no destructive  
qualification testing required (table 3A, page 3). For  
more information, please contact [foil@vpgsensors.com](mailto:foil@vpgsensors.com)
- For oriented performances please contact Application  
Engineering

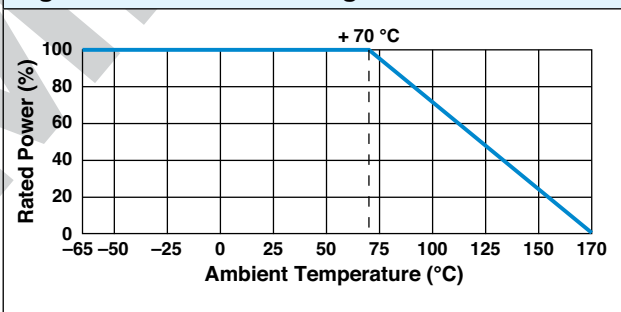


**Four terminal (Kelvin) design:**  
allows for precise and accurate measurements.

### INTRODUCTION

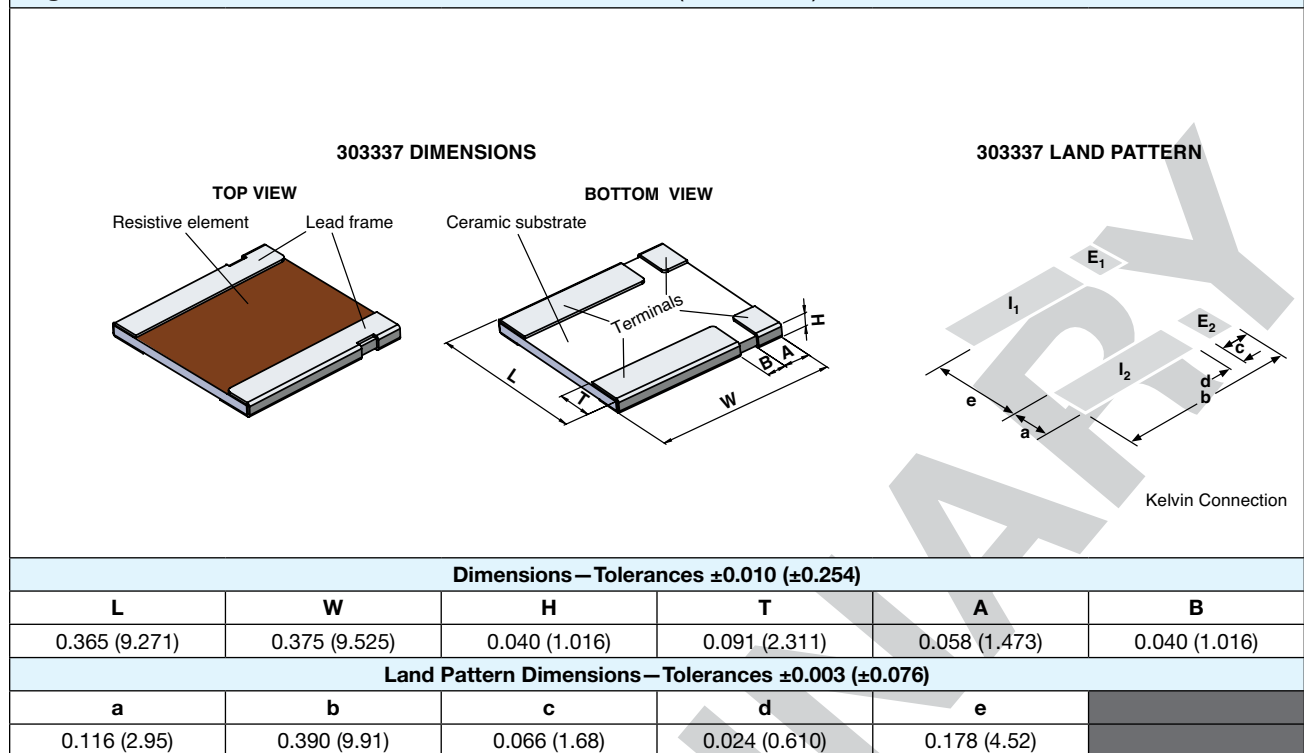
Model 303337 (CSM3637F with screen/test flow in compliance with EEE-INST-002) is a surface mount chip resistor designed with 4 pads for Kelvin connection. Utilizing Bulk Metal® Foil as the resistance element, it provides enhanced characteristic capabilities resulting in superior performance when compared with other resistor technologies. The unique combination of Z Foil technology along with the designed 4 pads lead frame configuration results in significant reduction of the component's sensitivity to applied power changes such as power coefficient of resistance (PCR) and thermal resistance.

**Figure 1 – Power Derating Curve**



**Table 1 – Specifications**

Parameter	Value
Resistance range	50 mΩ to 200 mΩ <sup>(1)</sup>
Power rating at 70°C	3 W
Maximum current <sup>(2)</sup>	7.7 A
Tolerance	±0.1
Temperature coefficient maximum (-55°C to +125°C, +25°C Ref.)	±15 ppm/°C, R < 100 mΩ; ±10 ppm/°C R ≥ 100 mΩ <sup>(3)</sup>
Operating temperature range	-65°C to +170°C
Maximum working voltage	(P x R) <sup>1/2</sup>
Weight (maximum)	0.29 g
<b>Notes</b>	
<sup>(1)</sup> Contact application engineering for values outside this range.	
<sup>(2)</sup> Maximum current for a given resistance value is calculated using $I = \sqrt{P/R}$ .	
<sup>(3)</sup> For tighter TCR, please contact application engineering: <a href="mailto:foil@vpgsensors.com">foil@vpgsensors.com</a> .	

**Figure 2—Dimensions and Land Pattern** in Inches (Millimeters)**NOTES**

- Tightest absolute tolerance: 0.1% for any value within the pertinent ohmic value range.
- Measurement error allowed for  $\Delta R$  limits: 0.0005  $\Omega$ .
- For prototype units, append a “U” to the model number (example: 303337U). These units have all of the table 2A 100% tests performed, with no destructive qualification testing required.

**Table 2 – EEE-INST-002 (Table 2A Film/Foil, Level 1) 100% Tests/Inspections<sup>(1)</sup>**

<b>RC Record</b>	In tolerance
<b>Thermal Shock</b>	25 x (–65°C to +150°C)
<b>RC Record</b>	$\Delta R = 0.1\%$
<b>High Temperature Exposure</b>	+170°C, 100 h, no power
<b>RC Record</b>	In tolerance $\Delta R = 0.2\%$
<b>Final Inspection</b>	5% PDA on $\Delta R$ , 10% PDA on out of tolerance
<b>Visual Inspection</b>	Magnification 30 x to 60 x
<b>Mechanical Inspection</b>	Dimensions, workmanship, 3 units sample size
<b>Note</b>	
<sup>(1)</sup> Vishay Foil Resistors will perform a pre-cap visual inspection 100% in the production flow prior to overcoating	

**Table 3 – EEE-INST-002 (Table 3A Film/Foil, Level 1) Destructive Tests – MIL-PRF-49465 AND 55342 <sup>(1)</sup>**

<b>Group 2</b>	Sample size: 3(0) Solderability	MIL-STD-202, method 208
<b>Group 3</b>	Sample size: 10(0) – mounted on FR4 TCR measurement per MIL-STD-202, method 304 Low temperature storage per MIL-PRF-49465 Low temperature operation per MIL-PRF-55342 Short time overload per MIL-STD-49465	$\pm 15 \text{ ppm}/^\circ\text{C}$ , $R < 100 \text{ m}\Omega$ ; $\pm 10 \text{ ppm}/^\circ\text{C}$ $R \geq 100 \text{ m}\Omega$ <sup>(3)</sup> ( $-55^\circ\text{C} / +25^\circ\text{C} / +125^\circ\text{C}$ ) $\Delta R = 0.02\%$ $-55^\circ\text{C} \pm 2^\circ\text{C}$ , 24 h $\pm 4$ h ambient no load dwell for 2 h to 8 h at $+25^\circ\text{C}$ $\Delta R = 0.02\%$ $-65^\circ\text{C}$ ambient no load dwell for 1 h, rated power for 45 min no load dwell at $+25^\circ\text{C}$ for 24 h $\pm 4$ h $\Delta R = 0.05\%$ $5 \times$ rated power at $+25^\circ\text{C}$ for 5 s, not to exceed maximum current rating
<b>Group 4</b>	Sample size: 9(0) – mounted on FR4 Resistance to soldering heat Moisture resistance per MIL-STD-202, method 106 (7a and 7b not required)	$\Delta R = 0.05\%$ performed per MIL-PRF-55342 para. 4.8.8.1 $\Delta R = 0.02\%$ 240 h, no power
<b>Group 5</b>	Sample size: 9(0) Shock per MIL-STD-202, method 213, condition I Vibration per MIL-STD-202, method 204, condition D	$\Delta R = 0.05\%$ 100G, 6 ms axes Z and Y, 10 shocks per axis $\Delta R = 0.05\%$ 10 Hz to 2000 Hz, 20G 2 axes, 6 h per axis
<b>Group 6</b>	Sample size: 12(0) – mounted on FR4 Life test per MIL-PRF-49465	$\Delta R = 0.1\%$ 2000 h, $+70^\circ\text{C}$ , rated power
<b>Group 7B</b>	Sample Size: 10(0) – mounted on FR4 Solder mounting integrity per MIL-PRF-55342	5 kg force, 30 s
<b>Group 9</b>	Sample size: 5(0) – mounted on FR4 High temperature exposure per MIL-PRF-49465	$\Delta R = 0.3\%$ 1000 h, $+170^\circ\text{C} \pm 7^\circ\text{C}$ , no power
<b>Group 10<sup>(2)</sup></b>	Sample size: 4	Per ASTM E595
<p><b>Notes</b></p> <p><sup>(1)</sup> Units selected randomly from lots which successfully passed the table 2A testing</p> <p><sup>(2)</sup> Optional, per customer request.</p> <p><sup>(3)</sup> For tighter TCR, please contact application engineering: foil@vpgsensors.com. Measurement error allowed for <math>\Delta R</math> limits: 0.0005 <math>\Omega</math>.</p>		

**Figure 3 – Global Part Number Information**

Model #	303337
Base Model	CSM3637F
Value Range	50 mΩ to 200 mΩ

Part Number:

{Model} - {Value} - {Tolerance} - {Termination} - {Packaging}

Absolute Tolerance	Code
0.1%	B
0.2%	E
0.25%	C
0.5%	D
1.0%	F

Termination	Code
Tin/lead	B

Packaging	Code
Waffle	W
Tape and reel	T

Example: 303337 - 0R123 - EBW

303337, 123 mΩ, 0.2%, tin/lead termination, waffle packaging



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